arranged to meet the requirements of artisans and those engaged in mechanical trades, and include mechanical drawing, building, construction, modelling, model drawing, outline drawing, and shading."

This section includes science teaching also, and classes were formed last year in inorganic chemistry, botany, principles of agriculture, fully illustrated by experiments; shorthand also, a useful help to all such studies.

Section C is Entertainments, and is set going or stopped as occasion offers; of course it is expected to be a help to the general fund.

Section D is the Youths' Institute, supported also by special honorary subscribers and by one penny a week paid by its members for admission to the reading-room, *because without that the room was too full*. Let us hope that such a very unsatisfactory statute of limitations may soon cease to be necessary. An extra rate would hardly be grudged in such a case, and it is a strong argument for Parliament authorising one.

Section E is a Private Subscription-room, supported by about a hundred members, who subscribe ten shillings a year each, spent in newspapers and periodicals, made available to the public after their use by the club.

Section F is a School of Music, where some of the best masters obtainable in London are engaged, two of whom take the combined instruction, and four take separate instruction. Nine different classes of lessons are arranged for, again not free, but all made available to those who wish for them, at very little expense or labour to themselves. It is now supported by 160 students, and by subscriptions from the vice-presidents.

Section G is the nucleus of a Museum; and how treasures of local interest are lost to a town for want of such a nucleus in trustworthy hands, the writer knows well! Central museums also can easily supply duplicate treasures to such institutions in almost perpetual succession.

Section H, the English Literature Club, meets weekly through the winter, at the library rooms, adding greatly to the care with which books are read, and, consequently, to the pleasure and information drawn from them. A very small subscription pays its, no doubt very small, expenses.

Even needlework in elementary schools, though spread about half the County of Herts, and patronised by a goodly company of influential ladies throughout the district, has its "head centre" in a committee of three gentlemen of the Watford Public Library. Fifty-four schools compete, and 1500 specimens are shown, in six classes of work, all having undergone a strict and very systematic examination.

The same association supports also a School of Cookery.

Other offshoots of the Library are the Herts Natural History Society, the Foresters' Club, Junior Foresters' Club, and the Shepherds' Club, each having its meeting-place at the library rooms.

Now among this variety of work there is probably none which is not carried on in nearly all the larger towns of England by *some* means. What we wish to set forth is the reasonableness of its all forming together the work of a single "committee of education," not necessarily elementary only by any means; and that a rate-supported public library should be the central institution, whose committee should set in co-ordinate motion all the parts of this local educational machine. Such a committee need not attempt to take into its hands the entire control of each separate branch, but should work all together with as little friction and loss of labour as possible, and especially should this be the case, as we have said, in our smaller towns. Very great is the economy of one institution working all together, in the matter of rooms, advertising, and printing; in one man receiving, as the librarian does at Watford, all the subscriptions and fees paid to these various societies, the 5 per cent. allowed him upon all giving him a tangible interest in increasing each, as such a central worker must have the means of doing, and in stirring all up to a friendly rivalry in well-doing. And the advantage can hardly be over-stated of the power of such an organisation to bring together earnest workers, who might otherwise have followed either a secluded path or one crossing that of other workers; in the one case, occurring most frequently in small communities, doing little for the advance of intelligence and information; and in the other case, to which large cities are most liable, wasting time and efforts which are often thwarted by mere local jealousies.

NOTES

In June of the present year the freshwater jelly-fish (*Limnocodium Sowerbii*) reappeared in the Royal Botanical Society's Gardens, Regent's Park, though in no great numbers. At the suggestion of Mr. George Busk, F.R.S., and with the courteous assistance of Mr. W. Sowerby, a small number were captured and transferred to the Victoria tank in Number 10 House at the Royal Gardens, Kew. Nothing was known of their fate till about a week ago, when it was observed that the whole tank was swarming with the progeny of the small colony brought from London.

The Local Committee at York have been making laudable exertions for the accommodation of those who intend to be present at the meeting of the British Association next week. They have prepared a long list of hotels and lodgings, with prices, at the same time stating that the prices of the lodgings are higher than will be eventually charged, "as there is abundance of good accommodation at reasonable rates." They have also issued a time-table of the arrivals and departures of trains at York station from the principal towns in the kingdom, with special tables for the local lines. A map of the city has besides been prepared, showing the situation of the principal buildings, the meeting-places of the various sections, and the principal hotels, of which there are fourteen.

The *Times* Geneva correspondent gives some further particulars concerning Prof. Raoul Pictet's model steamer now in course of construction, with which he expects to reach a speed of forty miles an hour, and which will make a trial trip on the lake in November next. Her dimensions are—16 metres long and 3·50 metres wide. When lying at anchor she will draw 33 centimetres fore and 44 centimetres aft; at full speed 1 centimetre forward and 16 centimetres aft. The engine will be placed amidships, from which point to the stern the screw-shaft and the keel form an inclined plane; the bows are long, tapering, and wedge-shaped. Prof. Pictet reckons that his invention will lead to a great saving of fuel, inasmuch as a steamer built on his plan, after being started with say 100 horse-power, may be kept up full speed with an expenditure of force equal to thirty horses. The form of the hull, on which the maintenance of the ship's equilibrium will depend, cannot be explained without a diagram. Prof. Pictet is quite confident in the success of his invention, and his previous scientific achievements have been so remarkable that many people who cannot follow his reasoning have no hesitation in accepting his conclusions.

The inhabitants of Havre are collecting money for raising a statue to Sauvage, who is considered in France as having applied the screw to the propelling of steamers.

A telegraphic experiment of a singular description was tried last week at the Trocadéro. It consists merely in the reading of large silvered zinc letters, a square metre in size, fixed on a blackened board, by refracting telescopes. This method has succeeded very well from the Trocadéro to the Panthéon, a distance of about three miles. The inventor, an officer in the French service, thinks he will succeed in reading messages at a distance of sixty miles under favourable circumstances.

M. EUGÈNE GODARD, the celebrated French aëronaut, who has been making ascents at Gotha, has been made by the Grand Duke a knight of his order. M. Darmentiers, another French aëronaut, having ascended from Montpelier, has been less successful. He was driven by a strong wind out to the Mediterranean Sea, where he perished according to all probability, no news having been received from him up to the latest date.

AN advertising vehicle is circulating in the Paris streets lighted at night by voltaic electricity obtained by bichromate elements. It circulates all round the Boulevards.

THE triple granite concentric vaulting of the St. Gothard Tunnel, in the quicksand formation under Andermatt, is now completed, and as the rings previously constructed remain intact, it is confidently hoped that a difficulty at one time thought to be insuperable has been conquered, and that the great tunnel will be finished by the end of October.

FROM the Report in the last Technological Examination of the City and Guilds of London Institute we see that the number of candidates and centres for examination have largely increased. The results are generally better than in the previous year, though from the examiner's reports there is, in most subjects, much to be desired. No doubt in the course of a few years, when the Institute has been fairly at work, the improvement in technical knowledge in the country will be very marked.

AN official investigation shows that the phylloxera infests an area of over 8000 square metres of the vineyards at Heimersheim, near Remagen, on the Rhine. The diseased vines were imported from Austria. Energetic steps are being taken for the annihilation of the disease.

THE death is announced of Capt. Popelin, one of the Belgian African explorers, who had established the station at Karema, on the south-east shore of Lake Tanganyika, where, apparently, he has succumbed to fever. Capt. Popelin was only thirty-four years of age.

THE British Archæological Association is holding its meetings at Malvern, which forms an admirable centre for excursions to antiquities of all kinds.

THE "Polytechnic" expires this week, many of our readers will be sorry to hear. The age seems to have outgrown its toy science, though doubtless the institution did good in its day in paving the way for the popularisation of real science. In the memories of our older readers it will doubtless be associated with many a happy day.

MR. WILLIAM ARCHER, F.R.S., Librarian of the National Library of Ireland, has just issued a pamphlet which we commend to his fellow-librarians. The pamphlet consists of "suggestions as to public library buildings, their internal plan and construction, best adapted to effect economy of space (and, hence, saving of cost), and at same time most conducive to public, as well as administrative, convenience, with more especial reference to the National Library of Ireland." We cannot enter into the details discussed by Mr. Archer, but his leading principles as to arrangement may be thus summed up in his own words:—"Central reading-rooms and offices connected, by short and sufficiently numerous radii, with a continuous circuit of book-rooms around and beneath the same, the books in the book-rooms on a greater or less number of tiers of standing presses, these not more than eight feet high—thus securing the immense boon of the abolition of ladders and galleries, and saving at once space (and cost) as well as the time of the public." Mr. Archer draws attention to the fact that the question of space is gradually becoming more and more urgent as regards this, the only large public library in Ireland, and that if the providing of enlarged accommodation is to be delayed until a science and art museum and a metropolitan school of art should be built, so as to hand over the buildings at present occupied by these for library purposes, it looks very probable that the library must come to a "stand still." He states further that the number of readers was never before so great as during the past winter, the evening readers having especially increased. The National Library of Ireland, therefore, even in its present cramped and inadequate quarters, is fulfilling a mission of usefulness.

AN important discovery has been made in the vicinity of Kenneh, Upper Egypt. No less than thirty-six well-preserved sarcophagi have been brought to light. They almost exclusively belong to the kings and queens of the older Thebes Dynasty. They contained mummies, papyrus scrolls, Osiris statuettes (some thousands), ornaments, and talismans. The royal names of Raskenes, Amenophis I., Ahmes, Nofretari, Aahhotep, Totmes II. and III., Seti I., Ramses XII., Pinotem, and other Pharaohs are mentioned in the texts, and show the importance of the discovery. The sarcophagi were all found in one sepulchral chamber.

THE "Smithsonian Report" for 1879 affords ample evidence that the Smithsonian Institute continues to carry on its great work with increasing efficiency. Its grants of money have been devoted to the carrying out of anthropological researches and geographical explorations, and to the publication of a large number of works bearing on the progress of science. Large additions have been made to the various departments of the free museum of the Institute. The Appendix to the Report, occupying the larger half of the volume, contains a number of papers bearing on the anthropology of the North American Indians, one paper of considerable length being "A Study of the Savage Weapons at the Philadelphia Exhibition," by Mr. E. H. Knight. Other papers in the Appendix are: "On the Present Fundamental Principles of Physics," by Prof. Franz Joseph Pesko; "A Universal Meteorograph, designed for Detached Observatories," by Prof. E. S. Holden.

THE *Transactions* of the Norfolk and Norwich Naturalists Society for 1880–81 contains several useful papers. One of the most interesting is that of Mr. Southwell, "On the Extinction of Species by the Indirect Acts of Man." Mr. Southwell adduces a number of instances in point, showing that experimental acclimatisation sometimes leads to disastrous results. Mr. H. W. Feilden contributes some remarks on the Natural History of Franz-Josef Land. From the presidential address we are glad to see that the Society continues to prosper.

A SHORT time ago a colossal whale was captured and killed on a sandbank near Westerland-Lylt (Schleswig). It measured 52 feet in length, 26 feet in circumference, and its tail-fin spanned 7 feet across. The animal must have entered the Watten Sea during high tide and lost itself in shallow water, when the receding tide left it upon the sand.

THE Medical and Sanitary Exhibition, organised by the Committee of the Parkes Museum, was open for the last time on Saturday, August 13, when the number of visitors, exclusive of season-ticket holders, was 1,221, making a total of 24,333 visitors for the four weeks during which the Exhibition has been open, allowing only for one visit by each season-ticket holder. During the day the secretary, Mr. Mark Judge, visited the different exhibitors for the purpose of ascertaining their opinion as to the success of the Exhibition. The exhibitors generally expressed themselves as well satisfied with the result, some going so far as to say that they had done an exceptional amount of business owing to the fact that a very large proportion of the visitors had been either medical men, architects, or engineers. The representatives of the exhibitors, who have been in daily attendance during the Exhibition, marked their appreciation of the arrangements made for their convenience by presenting on Saturday a small purse of gold to the superintendent, Mr. Smithson. The closing of the Exhibition was taken advantage of by the St. John Ambulance Association to give a demonstration of ambulance practice, and during the afternoon a large number of the visitors assembled in the conservatory to witness the practice, which was conducted by Major Duncan, Mr. Cantlie of Charing Cross Hospital, Mr. Furley, Dr. Crookshank, and Surgeon-major Baker. Prizes were competed for by squads of the Grenadier Guards, the Finsbury Rifles, and the Metropolitan Police. Mr. John Eric Erichsen (the chairman), Dr. Poore, Dr. Steele, Mr. George Godwin, Mr. Rogers Field, and other members of the Exhibition Committee were present during the day. It is expected that the prizes which have been awarded will be distributed at the Annual Meeting of the Parkes Museum in the autumn.

THE additions to the Zoological Society's Gardens during the past week include a Ring-tailed Lemur (*Lemur catta*) from Madagascar, presented by Mr. E. O. Brookfield; a White-collared Mangabey (*Cercocebus collaris*) from West Africa, presented by Mr. James Jameson; a Diana Monkey (*Cercopithecus diana*) from West Africa, presented by Mr. Louis Wyatt; a Macaque Monkey (*Macacus cynomolgus*) from India, presented by Mr. R. Edge; two Vulpine Phalangers (*Phalangista vulpina*) from Australia, presented by Mr. George White; a Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*) from the Moluccas, presented by Mrs. Beard; two Wonga-wonga Pigeons (*Leucosarcia picata*) from New South Wales, presented by Mr. J. Burnham; a Royal Python (*Python regius*) from West Africa, presented by Mr. G. H. Garrett; a Grey Parrot (*Psittacus erithacus*) from West Africa, deposited; a Lesser White-nosed Monkey (*Cercopithecus petaurista*), two Pluto Monkeys (*Cercopithecus pluto*) from West Africa, purchased; a Zebu (*Bos indicus*), a Pampas Deer (*Cariacus campestris*), born in the Gardens. Amongst the additions to the Insectarium during the past week are pupæ of *Attacus aurota* (one of which has since emerged) and *Ceratocampa ixion*, from Brazil; larvæ of the Madder Hawk-Moth (*Deilephila galii*), the Death's-head Hawk-Moth (*Acherontia atropos*), the Poplar Hawk-Moth (*Smerinthus populi*), and Fox Moth (*Bombyx rubi*), and perfect insects of the Water Stick-insect (*Ranatra linearis*).

PHYSICAL NOTES

M. SAMUEL, of Ghent, has brought before the Belgium Academy a method of registering telegraphic signals received through the mirror galvanometer (*Bull.*, No. 5). On the screen receiving the light are fixed two selenium elements, one to the right, the other to the left. When either is illuminated its conductivity of course increases, and it acts as a relay on an electro-magnet, which causes a Morse dot or dash to be marked on paper. There are two local batteries, one having two circuits, which pass through the selenium pieces and the electro-magnets, while the other is for the electro-chemical writing. In this latter, a band of paper saturated with iodide of potassium passes continuously over a small copper cylinder which is connected with one pole of the second battery. Above the paper are the ends of the armatures of the electro-magnets; to one is attached a vertical platinum rod, to the other a small triangle with platinum base (horizontal). The rod and triangle are connected, through the armatures, with the other pole of the second battery, and they press the paper band on the cylinder each time the armatures are attracted, giving a dot or a dash as the case may be. The dashes, instead of being longitudinal, are at right angles to the length. If the ordinary lamp of the galvanometer be replaced by sunlight or lime-light, the electro-magnets (M. Samuel points out) may be actuated directly without use of a galvanometer relay; Bell's selenium elements having an average resistance of only 150 ohms in sunlight, and 300 ohms in darkness.

AN evaporimeter with constant level has been recently described by Prof. Fornioni (*Reale Ist. Lomb.*, vol. xiv. fasc. x.-xi). It consists of an oblong wooden case with a brass spiral descending into it from a micrometric screw. The spiral carries at its lower end a small glass vessel which acts as feeder. A glass siphon extends outwards horizontally from the feeder, and has at its outer end a small cup, in which the evaporation takes place. As the water evaporates in the cup the feeder is lightened, and rises by action of the spiral, thus keeping the level constant. A fine layer of oil in the feeder prevents evaporation from its water-surface. There are guides to control the vertical movements of the feeder, which, moreover, are indicated by means of a weighted thread, affecting an external index on a disk. The graduation of the instrument is expressed in millimetres of the height of water in the evaporating vessel.

SIGNOR MAURI (*Riv. Sci. Inst.* No. 11) obtains an economical and very compact battery carbon, intimately united with the electrode, as follows:—Finely-powdered graphite is mixed with an equal weight of sulphur (which should be free from carbonates), and the mixture is heated in an iron vessel until complete fusion of the sulphur. The temperature should not be raised beyond 200°. When the mass is fluid it is poured into a suitable metallic mould, and a thick copper wire, bent zigzag, is quickly inserted, a part being left projecting. The mass is let cool slowly: then it is easily drawn from the mould and is ready for use. These carbons have a conductivity practically equal to that of retort carbon, and are more electro-negative, consequently better adapted for electromotive force. Coke-powder cannot be substituted for graphite, because it has too little conducting power. By increasing the proportion of sulphur, the resistance may be increased at will, and strong resistances may be thus easily prepared in place of resistance-coils of copper wire. (S. Mauri further indicates a way of utilising graphite in construction of a miner's fuse.)

REPEATING Mercadier's experiments in which an intermittent beam meets smoked a surface within a glass tube containing aqueous or ammoniacal vapour, and furnished with an ear-tube, Prof. Mugna lately (*Riv. Sci. Ind.* No. 11) made the effects much better heard by attaching a small microphone to an elastic membrane closing the tube; and it was possible to operate at such distance from the interrupting apparatus, that its noise was no longer disturbing. Prof. Mugna further experimented by suspending horizontally from a cocoon-fibre, within a glass case, a short fine glass rod, with terminal laminæ of card or glass, or very fine metallic foil. An intermittent beam sent against one of the laminæ when they were in a position parallel to the wheel drove the system round in direction of the beam, indicating (the author considers) a direct action of the latter. An air-current due to thermal action should produce the opposite motion. Besides, the phenomenon is still better when the air is rarefied.

IN a note to the Vienna Academy, Dr. Margules calls attention to the beautiful figures that are produced in glycerine, when the liquid is moved in a regular way, by rotation of a disk in contact with it. These figures afford an insight into the form of the surfaces and paths of the currents. They are due to the water contained in the glycerine.

THE method described by Herren Kirchhoff and Hahnemann last year for determining the heat-conductivity of metals, has been applied by them (*Wied. Ann.*, No. 7) to three varieties of iron, and to lead, tin, zinc, and copper; and the electric conductivity of these metals has also been measured. The conclusion is that the ratio of these conductivities is in general constant in these different metals, with exception of iron, and it is thought the exception may be connected with magnetic properties. Herr H. F. Weber's result disagrees with this, for he finds the ratio to be a linear function of the product of specific heat and density. The authors are unable to discover the cause of this discrepance.

AN initial attempt to elucidate the ratio of the specific heat of liquid organic compounds to their composition has been made by Herr von Reis (*Wied. Ann.*, No. 7). It appears from his researches that the difference of the molecular heat of homologous compounds at 20° boiling point, and from 20° to 100°, is very regular: in the former case it is 8·0 and in the latter 7·5.